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I, JULIE BILLINGSLEY, TEAM LEADER EXAMINATION SUPPORT AND SALES hereby certify that annexed is a true copy of the Provisional specification in connection with Application No. 2002953236 for a patent by MARIO PANUCCIO as filed on 10 December 2002.

WITNESS my hand this
Twelfth day of January 2004

J. Billingsley

JULIE BILLINGSLEY
TEAM LEADER EXAMINATION
SUPPORT AND SALES

# AUSTRALIA
*Patents Act 1990*

## PROVISIONAL SPECIFICATION

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Invention Title: Process for Operating a Water Treatment Plant

This invention is described in the following statement:

# PROCESS FOR OPERATING A WATER TREATMENT PLANT

The present invention relates to a process for operating a water treatment plant. In particular, the present invention relates to a process for operating a water treatment plant associated with a manufacturing facility from which water is recycled and processed in the water treatment plant.

Many manufacturing processes result in the production of waste water. Environmental considerations require that waste water produced as a by-product from manufacturing processes be treated to remove contaminants prior to the disposal or reuse of the waste water. Statutory authorities regulate the level of contaminants that may be present in waste water disposed of through storm water, grey water or sewerage systems. Prior to such disposal of waste water it is often necessary to remove one or more contaminants whereby the waste water is of a quality suitable for disposal. In any process where contaminants are removed from waste water the contaminants need also to be disposed of. The disposal of such contaminants may be costly or technically difficult.

In many manufacturing processes waste water is produced as a by-product and has relatively high levels of suspended solids. The suspended solids may be removed by filtration or other processes to an acceptable level. However, the filter cake or waste that is produced by these processes requires disposal. Waste water containing other contaminants may require treatment by other processes to remove contaminants. However, the contaminants removed from the waste water require separate disposal. The disposal of contaminants removed from waste water is often regulated and there disposal imposes a cost or technical burden on the operator.

We have now found a process for operating a water treatment plant associated with a manufacturing process whereby the quantity of waste produced for disposal may be reduced. According to the present invention there is provided a process for operating a water treatment plant comprising charging a storage tank with recycled water from a manufacturing process, determining the concentration of one or more selected contaminants in the storage tank, diluting the recycled water whereby the concentration of the one

or more selected contaminants in the storage tank is at or below a desired level, and utilising water from the storage tank in the manufacturing process.

The present invention recognises that many manufacturing process can accept water having a certain level of contaminants. Typically in manufacturing processes the quantity of waste water produced is less than that which is required in the operation of the manufacturing process. Thus additional water is sourced for use in the manufacturing process. This additional water typically will be obtained from a town water supply and the substantially uncontaminated. We have found that by using substantially uncontaminated water to dilute the waste water from the manufacturing process it is possible to recycle a greater proportion of the by-products of the manufacturing process and thereby minimise the amount of waste produced in the treatment of the waste water.

The present invention will be described in detail with respect to the manufacture of ready mixed concrete, but it will be appreciated that the process of the present invention will be applicable to a variety of other manufacturing processes.

In the manufacture of ready mixed concrete water is used in the production of concrete. The water is combined with the other components including the cement and the particular effluent. A significant quantity of water is also used in washing the equipment used in the manufacturing process. It is necessary for the equipment to be washed before the concrete sets and in the washing process a significant quantity of suspended solids contaminates the water. Water is also used in washing out the rotating bowls mounted on vehicles used to distribute the ready mixed concrete. Typically the water used for washing may be initially collected in a pit from which the used water may be pumped into a storage tank. The use of a pit for providing an initial storage of the waste water advantageously allows the variations in the usage and collection of water used for washing to be buffered and a continuous flow of waste water pumped from the pit into the storage tank.

The water used to wash the concrete manufacturing equipment and the bowls of the distribution vehicles is typically contaminated with

suspended solids. The concentration of suspended solids in the storage tank may be determined by any convenient means. It is preferred that the concentration of suspended solids be continuously monitored such that as the concentration of suspended solids exceed a desired level the recycled water in the storage tank may be diluted such that the level of suspended solids is reduced to or below the desired level. We have found that in the treatment of recycled water for subsequent use in the manufacture of ready mixed concrete it is preferable that the level of suspended solids be maintained at or below 50,000ppm, more preferably below 20,000ppm. Conveniently we have found that the use of a specific gravity meter enables the level of suspended solids to be readily determined. A specific gravity of 1.03 adequately approximates water having 50,000ppm of suspended solids and a specific gravity of 1.02 adequately approximates water having 20,000ppm of suspended solids that may contaminate the water from washing concrete manufacturing equipment.

Recycled water from the storage tank may be used to provide the water for use in the manufacture of ready mix concrete. Water may be extracted from the storage tank and used as batch water in the manufacture of concrete and/or be taken from the storage tank to be used for washing of the concrete manufacturing equipment and the rotating bowls of distribution vehicles.

Water taken for use in the manufacturing of additional batches of concrete may be further diluted, such as in a header tank prior to its use in the manufacture of additional batches of concrete.

The water used to dilute the recycled water may be water derived from a town water supply of potable water or other source of relatively clean water. In one embodiment of the present invention, where the selected storage capacity of the system is reached the water used to dilute the recycled water may be excess recycled water that has been subjected to a purification process. In another embodiment of the present invention, a portion of a heavily contaminated batch of recycled water may be filtered to remove excess suspended solids from that portion and the filtered recycled

water may be subsequently used to dilute the remaining recycled water in a storage tank.

In a continuous manufacturing process it is preferred that a plurality of storage tanks be used in sequence. Thus, water pumped from a storage pit may be used to initially charge a first storage tank and the recycled water within the first storage tank is diluted as necessary to maintain a contamination level below the desired level of suspended solids and once that storage tank is full, or being used as a source of water for the manufacture of further batches of concrete or for the washing of the manufacturing equipment or the rotating bowls of distribution vehicles the recycled water pumped from the pit may be pumped into a second storage tank and the recycled water in the second storage tank may be diluted to maintain a level of suspended solids at or below the desired level. Similarly third and subsequent storage tanks may also be used. The number and size of the storage tanks will be determined by the quantity of recycled water required for use in the manufacturing process.

In use, a water treatment plant comprising a plurality of storage tanks may be used according to the following process. Recycled water collected from the manufacture of ready mix concrete may be collected in a pit such that recycled water may be removed from the pit on a continuous basis, thereby buffering the water treatment process from any variation in the flowing rate of water to be recycled. Water pumped from the pit may be charged into a first storage tank and the level of suspended solids in the first storage tank measured using a specific gravity meter to determine the level of suspended solids. Where the concentration of suspended solids in the first storage tank exceeds a specified value the recycled water is diluted such that the concentration of suspended solids is at or below a specified level. Once the first storage tank is full, the water pumped from the pit is charged into a second storage tank. The concentration of suspended solids in the second storage tank is also measured and the recycled water is diluted to maintain the concentration of suspended solids below a desired level. Third and subsequent storage tanks may be employed in the same manner. In the

event that the concentration of suspended solids in a storage tank exceeds the specified value and the storage tank is full so that further dilution is not possible, some of the recycled water in the storage tank may be pumped to the surge tank for purification.

It would be apparent that the process of the present invention may be applied to the operation of water treatment plants in manufacturing processes other than in the manufacture of ready mix concrete. Other manufacturing processes may advantageously employ the method of the present invention.

The present invention will now be described with reference to the accompanying drawings. The accompanying drawings serve to illustrate, but not limit, the present invention.

Figure 1 is a process flow diagram showing the flow of recycled water within a water treatment plant operating in accordance with the present invention.

Figure 2 is a flow chart for the operation of the water treatment plant shown in Figure 1.

Water used for washing concrete mixing equipment including rotating bowls and vehicles used for distribution is passed through a recycler shown in Figure 1. The recycler separates particulates into various grades dependant upon size. It can be seen from the process flow diagram that particulates of 20mm or greater are separated into one stream, particulates of from 10mm to 20mm are separated into a second stream and sediment or fines are removed from a third stream. The resultant water for recycling may include suspended solids. The water is collected into a first pit, pit A, from which it is pumped into a second pit, pit B, by a non return pump. Recycled water containing suspended solids may be pumped from pit B using a non return pump into a first silo through valve V3. Valve V5 is open and water from silo 1 may be pumped through a specific gravity meter and returned through valve 11 to the silo. Alternatively or in addition, the water may be pumped through valve 9 into a water header tank. The water header tank contains water for use in the manufacture of batches of ready mixed

concrete. Additional water may be added to the water header tank directly from the town water supply through valve 10.

In the event that the specific gravity measured on the gravity meter 1 exceeds a predetermined value the recycled water in silo 1 may be diluted using either town water through valve V1 or using filtered water through valve V2. Water may be removed from silo 1 through valve V4 for use in washing the concrete manufacturing equipment or the rotating bowls of distribution vehicles. Such water is then available for collection through the recycler as discussed above. In the event that the recycled water in silo 1 is contaminated at a level substantially in excess of the preset value the recycled water from silo 1 may be pumped through valve V8 with a non return pump into silo 4 through valve V6. Silo 4 may also be filled directly from pit B through valve 3. Water may be filtered from silo 4 through valve 7 in a press. Filter cake may be removed from the press for disposal. The filtered water may be pumped using a non-return pump into the first or subsequent storage silos through valve V2.

Once any of the first silos are filled, the process for operating the water treatment plant may direct the water through subsequent storage silos.

An example of the process control used in the operation of the water treatment plant is shown in Figure 2.

DATED this 10th day of December 2002

**MARIO PANUCCIO**

By His Patent Attorneys

CULLEN & CO.

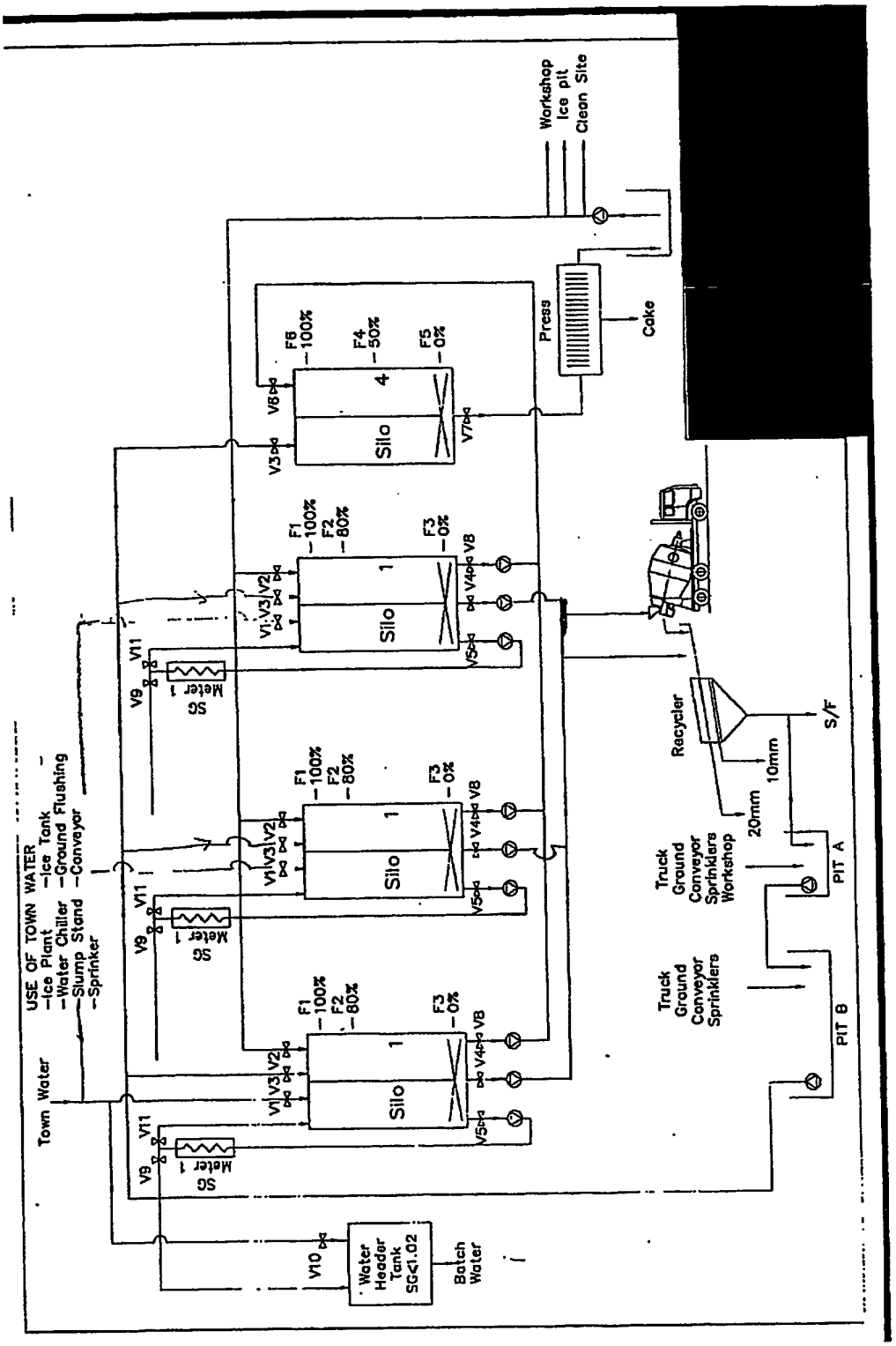
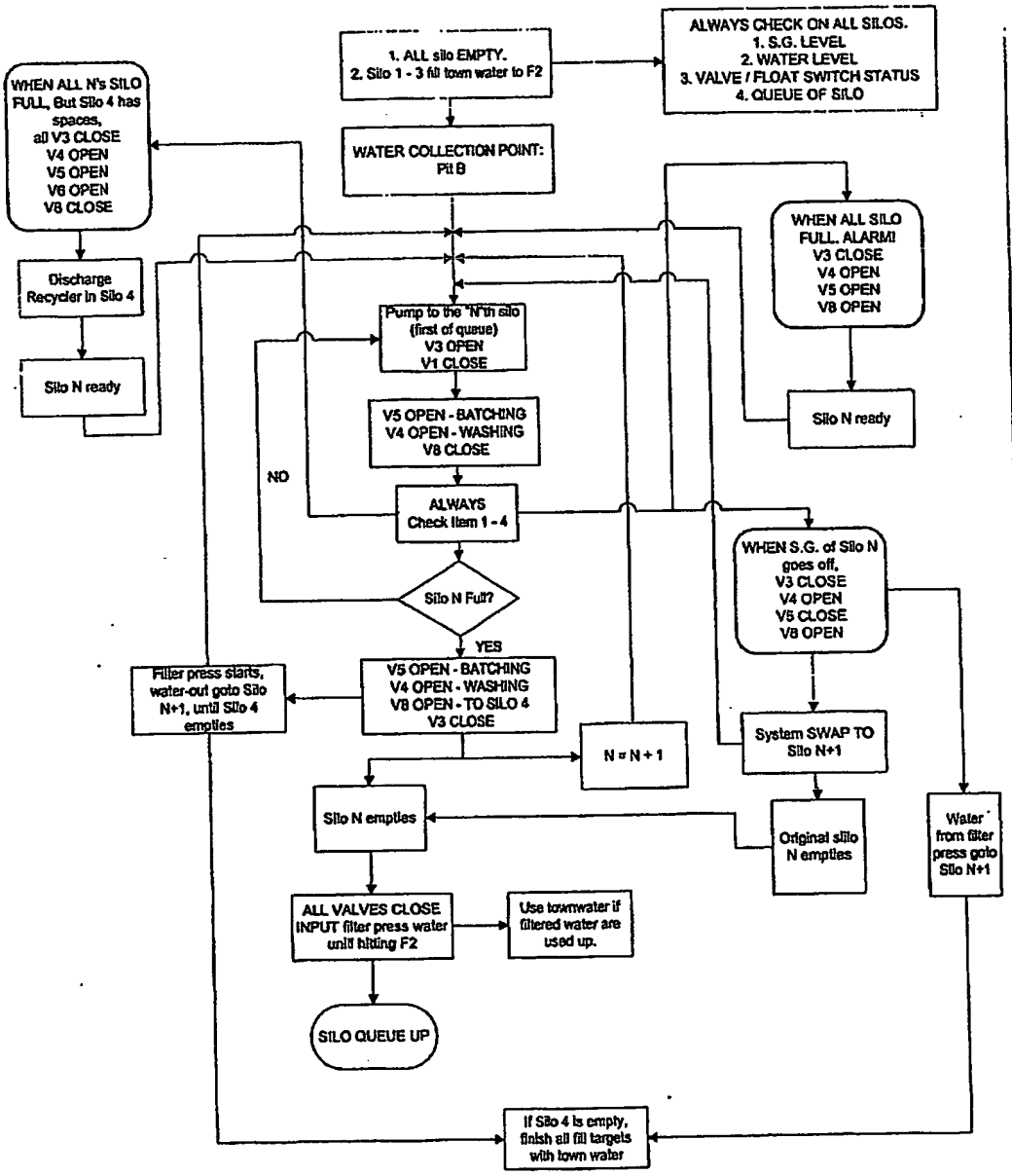

Workshop
Ice pit
Clean Site
Press
Cake
F6 — 100%
F4 — 50%
F5 — 0%
Silo 4
V6
V7
V3
F1 — 100%
F2 — 80%
F3 — 0%
Silo 1
V1
V2
V3
V4
V5
V8
V9
V11
SG
Meter 1
Recycler
S/F
10mm
20mm
PIT A
PIT B
Truck Ground Conveyor Sprinklers Workshop
Truck Ground Conveyor Sprinklers
USE OF TOWN WATER
-Ice Plant
-Water Chiller
-Slump Stand
-Sprinker
-Ice Tank
-Ground Flushing
-Conveyor
Town Water
V10
Water Header Tank SG41.02
Batch Water

FIG. 1

## Flow chart for treatment plant programming




PRIORITIES

1) Should SG of Silo N go off, load being batched to be finished with town water, swap system to Silo N+1.

2) Silo to be filled to que in order in which they arrived at que.

*) Silo 4 can be set to a float switch level which itself can be moved up and down according to the amount of work expected each day. I.e. the system can be set up to match different work conditions.

X) When Alarm sounds system should have spare capacity in Silo 4 to restart plant after rain.

FIG. 2